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ABSTRACT

The Minnesota Teacher Attitude Inventory (MTAI) consists of 150 items in its original form. For practical and economical reasons, seven shorter versions formed from the 150 items and based on previous studies were tested on their validity and discrimination value. Responses of 90 teacher trainees, who in 1982 were enrolled at the Institute of Education in Singapore, were rescored according to the items in the shorter forms. Statistical analyses show that scores on the shorter forms correlated highly with those on the original form and all the other shorter forms. Moreover, most of the shorter forms differentiated the teacher trainees with respect to their teaching practice performance. As such, shorter versions with well-selected items could be recommended for future application. Two data tables and a list of the 150 items selected for the shorter forms of the MTAI are included. (Author/SLD)

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THE MINNESOTA TEACHER ATTITUDE INVENTORY REVISITED: HOW ABOUT A SHORTER FORM?

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The Minnesota Teacher Attitude Inventory consists of 150 items in its original form. For practical and economical reasons, seven shorter versions formed from the 150 items based on previous studies were tested on their validity and discrimination value. Responses of 90 teacher trainees were rescored according to the items in the shorter forms. Statistical analyses show that scores on shorter versions correlated highly with those on the original form and all the other shorter forms. Moreover, most of the shorter forms differentiated the teacher trainees with respect to their teaching practice performance. As such, shorter versions with well selected items could be recommended for future application.

Many studies have been conducted to determine the effectiveness of the Minnesota Teacher Attitude Inventory--MTAI (Cook, Leeds, & Callis, 1951). Results are both positive (Popham, & Trimble, 1960; Standlee, & Popham, 1959) and negative (Rabinowitz, & Rosenbaum, 1958). Although the MTAI is a widely-used instrument employed for the purpose of measuring teacher attribute, for prediction of teaching success as well as in research on teacher characteristics, many comments have been made in terms of its predictive power (Rabinowitz, & Rosenbaum, 1958; Shivley, 1982; Wong, 1989), its constructs (Bell, 1977; Horn & Morrison, 1965; Wong,1984c; Yee, 1967; Yee & Fruchter, 1971), its validity (Bell, 1977; Leeds, 1969; Yee, 1967), its items (Eng & Team, 1983; Wong, 1984a, 1984b, 1984d; Yip, 1982), and its scoring key (Budd, & Blakely, 1958; Gage, 1957; Wong, 1984d; Yee, 1967).

On questioning the assumption of the authors of the MTAI that all the 150 items measure one dimension of teacher effectiveness, Eng and his colleagues

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(1983), Horn and Morrison (1965), and Yee and Fruchter (1971) extracted several factors which explained a substantial proportion of the common variance of all the items. In each study, items that fell outside the factors or items with less than factor loading of .3 totalled more than 50 percent of the items.

Both Wong (1984a, 1984d), and Yip (1982, 1985) noted that about half of the items discriminated the teacher trainees who did well in the Diploma of Education program (a program preparing teachers for the secondary schools) from those who did not. Results of previous studies also demonstrated that not all the 150 items measure what they are intended to measure. Some items do not even function as desired (Budd & Blakely, 1958).

Being the person responsible for the items of the MTAI, Leeds (1969), in his longitudinal study involving 100 teacher trainees, eliminated those items that showed little predictive validity in the hope of raising the predictive validity coefficient. Thrice he tried out shorter forms-- utilizing the original scoring key on 75 items, scoring 102 items with a new key, and 85 items with modified scoring--and each time, he found a substantial increase in the predictive validity and concurrent validity. Whether the increase in predictive value is due to the reduction of items or the use of a different scoring key should be further studied and confirmed.

Noted the evidence that the MTAI is multidimensional and that fewer than 150 items are necessary to measure the factors, Bell (1977) tested the 60 items identified by Yee and Fruchter (1971). The MTAI was completed by students entering into the teacher education program--331 elementary majors, 209 secondary majors, and 135 all levels majors. Correlations were computed between scores on the 60 items and 150 items for the three types of students. Correlations coefficients were around .96 for all the groups. These studies

serve as the basis for supporting the validity of shorter versions of the MTAI by eliminating the ineffective items. The purpose of this study was to test the possibility of reducing the number of items of the original MTAI from 150 items to form valid but shorter versions which should be more practical and economical to use.

Shorter forms

For this study, the shorter versions described below consist of items that have been tested and found to discriminate the teacher trainees who did well from those who did poorly in their performance. Items that have significant loadings on the factors extracted in previous factor analyses are also considered. See Appendix I for the inclusions of items in the various forms.

a) MTAI-73: Horn and Morrison (1965), in demonstrating that the MTAI was not unidimensional, "parcel" factor analysed the scores of 306 students enrolled in the education courses and extracted five factors consisting of 73 items. These 73 items form the MTAI-73, a shorter version of the MTAI for the present study.

b) MTAI-60: Similar to Horn and Morrison (1965), Yee and Fruchter (1971) did a factor analysis on the MTAI scores of 368 experienced teachers and extracted also five factors comprising 60 items. With these 60 items, the MTAI-60 is thus formed.

c) MTAI-37: Based on the scores of 176 experienced teachers, Eng and his colleagues (Wong, 1984) did a principal component analysis with varimax rotation. They found four factors which accounted for 23.3 percent of the common variance of the 150 items. The 37 items which have factor loadings of .3 and above on the four factors are included in this shorter version, the MTAI-37.

d) MTAI-34: Using the scores of the same group of experienced teachers above, Eng and his team (1983) item analysed the scores of the effective teachers (N=100) and the non-effective teachers (N=76) as identified by the principals of their schools where they were teaching. Thirty-four of the 150 items were found to have discrimination index greater than 0.2, indicating that these items could somewhat differentiate the effective teachers from the non-effective teachers. These 34 items form yet another shorter version.

e) MTAI-45: Likewise, the scores of two different batches of trainees (1982 and 1983) enrolled in the Diploma in Education, were analysed separately. The MTAI scores of about 100 effective and non-effective teacher trainees chosen on the basis of their teaching practice grades (Wong, 1984a; Yip, 1985) in each intake were item analysed. Items that were found to be discriminating in both batches were included in the MTAI-45.

f) MTAI-17: These 17 MTAI items had been found to have discriminative value in all three groups mentioned in d) and e). In other words, these 17 items were able to differentiate either effective teachers from non-effective teachers, or trainees in two different years who did well from those who did poorly in teaching practice.

g) MTAI-27: Of all the above studies, local or abroad, 27 items were noted to contribute nothing in terms of factors or discrimination. This shorter version of the 27 items was included as a contrast with those shorter forms above. It was hypothesised that MTAI-27 would be less correlated to and less sensitive than the original form and the other shorter forms. As such, the correlation coefficients calculated will generally be lower than those found among the other forms. Moreover, it is expected that the MTAI-27 does not discriminate well, namely, the trainees good at teaching practice from those poor at teaching practice.

METHOD

The responses of the MTAI of the 1982 Diploma in Education students, Institute of Education, Singapore, were reanalysed. Those students with good and poor performance in teaching practice were identified. They were 45 students whose teaching practice grades were A, A-, and B+, and 45 students with grades of C, C-, and D. Their responses to the 150-item inventory were selected and rescored according to the items of each of the shorter forms. As such, each of the 90 subjects had eight "MTAI" scores, one on the original 150 items, and one on each of the seven shorter versions. Comparisons of the scores on the various forms were made to see how close these scores were related to one another. The data were first analyzed to determine whether fewer items could be used as the basis for shorter forms of the MTAI. The Pearson product-moment correlation coefficients were computed between each possible pair of scores on the different forms to check the extent to which these scores were related.

The second analysis was to find the degree of sensitivity of the various forms of the MTAI. Mean scores for each effective group and non-effective group for each form were computed. A t-test was carried out to test the significance of the difference between the mean scores of the effective and non-effective groups. This was to determine whether each of the shorter versions can differentiate as well as the original form the effective trainees from the non-effective ones.

RESULTS AND DISCUSSION

The correlations among the various forms of the MTAI are very high (see Table 1). These suggest that shorter forms of the MTAI can be used in place of the 150 items and are as reliable in measuring teacher attitude as that of the original version of 150 items, though MTAI-60 and MTAI-27 appear less so.

[INSERT TABLE1]

The t-statistics in Table 2 indicate that all the shorter versions of the MTAI, except MTAI-60 and MTAI-27, distinguish significantly between the more effective teaching group and the less effective teaching group of trainees. This implies that shorter versions are equally valid if items selected are carefully scrutinized and cross-validated.

[INSERT TABLE 2]

Surely any long questionnaire will take longer time and more manpower to administer and score. Respondents will also need more energy and time to complete. Once fatigue sets in, the responses made may not even be as valid as those derived from shorter instruments . Owing to the above reasons, shorter versions of an instrument should be encouraged. For economical and practical reasons too, shorter forms have advantages surpass that of the original and longest form if they proved to be valid.

From the results of this study, it seems justifiable to use shorter versions of the MTAI. However, shorter forms such as MTAI-60 and MTAI-27 do not appear as good as the other forms. It is advisable therefore, that in shortening the MTAI for use, we should be cautious in selecting the items--sets of items that are highly correlated with the original form, and items that have high discriminating power should only be used. Further cross-validation of the shorter versions is necessary to ensure validity of the "instruments."

Looking at the correlation coefficients in Table 1, anyone will wonder why the MTAI-60 was not comparable to MTAI-73 in correlating with the various forms. A possible explanation could be that Yee and Fruchter (1971) had

experienced teachers in their study, whereas Horn and Morrison (1965) had a sample of student teachers, a sample similar to that of the present study. Similarly, a query will be raised as to why MTAI-34 is highly correlated with most of the forms while MTAI-60 does not. This could be explained that the MTAI-34 items resulted from a study with experienced teachers, who had the same culture, thus perception and attitude, as the subjects in this study. Hence, we can infer that MTAI items are culturally biased, and responses are also affected by teaching experienced. This again needs further demonstration and confirmation.

The statistical analyses reveal that MTAI-17 highly correlates with MTAI-150 and most of the other short forms. Moreover, it discriminates very well between the two groups of trainees with different performance in teaching practice. It is more advantageous than MTAI-45 because of its very short length. In view of such encouraging results all indicating the validity and discriminative value of MTAI-17, we should attempt a longitudinal study to try out MTAI-17 on other subjects and intakes to ensure its validity and reliability for future use.

Although the MTAI has been highly criticised for its inability to predict teacher effectiveness when used singly, it is recommended for further research and validation as a subtest of a battery of tests. Since effective teaching is a complex entity, no one instrument has been found to have high predictive value. I am hopeful that with modification, the MTAI, the shortened version or otherwise, will become a more useful instrument when used together with other assessment devices for prediction of teaching effectiveness or teacher selection. I also believe that improvement and further improvement of an extensively researched instrument, like the MTAI, is far easier and faster than to design an entirely new instrument.

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TABLE 1 - CORRELATIONS AMONG THE SHORTER FORMS AND THE ORIGINAL FORM OF THE MTAI

Form	MTAI-73	MTAI-60	MTAI-45	MTAI-37	MTAI-34	MTAI-17	MTAI-27
MTAI-150	.942	.448	.920	.867	.896	.864	.527
MTAI-73		.542	.939	.886	.868	.874	.351
MTAI-60			.461	.515	.392	.415	.230*
MTAI-45				.902	.880	.910	.346
MTAI-37					.856	.827	.344
MTAI-34						.935	.355
MTAI-17							.306

NOTE: N=90. * indicates that $p = .029$. The rest are significant, $p < .002$

TABLE 2 - T-TESTS ON THE MEAN SCORES OF THE HIGH AND THE LOW EFFECTIVE TEACHING GROUPS ON THE VARIOUS FORMS

	High Effective Group (N=45)		Low Effective Group (N=45)			
Form	Mean	S. D.	Mean	S. D.	t-statistics	p-value
MTAI-150	18.62	27.55	-1.80	32.35	3.22	.002
MTAI-73	15.27	15.86	2.78	1.74	3.31	.001
MTAI-60	6.47	10.39	4.44	11.47	0.88	.383
MTAI-45	13.91	12.18	2.87	15.47	3.76	.000
MTAI-37	6.07	8.88	0.64	12.00	2.44	.017
MTAI-34	6.91	8.16	1.38	11.26	2.67	.009
MTAI-17	5.89	5.44	1.04	7.05	3.65	.000
MTAI-27	3.47	5.37	2.18	4.86	1.19	.240

Items included in various shorter forms

Items	MTAI-73	MTAI-60	MTAI-45	MTAI-37	MTAI-34	MTAI-27	MTAI-17
1		5					
2	3			4			
3						82	
4						√	
5						√	
6	2				√		
7	4			2			
8						√	
9						√	
10	3						
11	3						
12	1		√				
13	3	3	√				
14	4			4			
15	5	4					
16		4			√		
17						82	
18						82	
19	1	1	√	1			
20		2					
21	1	1					
22	2						
23	1	1					
24	1	1		1			
25	2		√	2	√		√
26						√	
27		3					
28	3		√	4			
29	2		√				
30	2		√	4	√		√
31	4		√		√		√
32	3		√				
33						√	
34		2	√				
35	1	1	√	1			
36		1			√		
37	2						
38	2						
39						82	
40						√	
41	3						
42						√	
43	3						
44	3		√				
45						√	
46				1	√		
47	3	3					
48			√	1	√		√
49			√	3			
50	1		√	1			

Items	MTAI-73	MTAI-60	MTAI-45	MTAI-37	MTAI-34	MTAI-27	MTAI-17
51			✓				
52		1					
53		4					
54		1		1	✓		
55				1	✓		
56	3						
57	1		✓	1			
58			✓				
59						✓	
60						82	
61					✓		
62						✓	
63	1	1		1			
64	5	4					
65	1	1	✓	1	✓		✓
66						83	
67	4		✓				
68						✓	
69	3		✓				
70	3				✓		
71		4					
72	3	3					
73						✓	
74	2		✓		✓		✓
75	3	1					
76	1	1	✓	1			
77	2	4	✓				
78						✓	
79					✓		
80	1	1	✓	1	✓		✓
81		3			✓		
82						✓	
83	2		✓	1			
84			✓				
85	3	3					
86	3	3					
87						82	
88	3	3					
89				2	✓		
90		5					
91						✓	
92	1	1		1	✓		
93	5	4	✓				
94	2		✓	1	✓		✓
95						63	
96	2		✓	3	✓		✓
97					✓		
98						82	
99		2	✓	2			
100	3		✓		✓		✓
101		5					
102						✓	
103	3	3					
104	1						

Items	MTAI-73	MTAI-60	MTAI-45	MTAI-37	MTAI-34	MTAI-27	MTAI-17
105						√	
106	2				√		
107		5			√		
108						√	
109		1	√	1	√		√
110	1	1	√	1			
111	4		√				
112						82	
113	2	5	√	3	√		√
114	2	1					
115	3	3	√				
116	1	1	√	1	√		√
117						√	
118		3					
119	2	2					
120						√	
121	2	2	√				
122	4			3			
123						82	
124	2	2	√		√		√
125						√	
126	1	1	√	1			
127	2			2			
128	2	1	√		√		√
129	3	3		3			
130	2						
131		2	√	2			
132	2	2	√	2	√		√
133		2	√		√		√
134	2	2					
135						√	
136		2					
137		2		2			
138						√	
139	4						
140	5						
141		2					
142						82	
143						83	
144		2					
145						√	
146		5			√		
147						√	
148						82	
149		2			√		
150						√	

Note: In columns MTAI-73 and MTAI-60, numbers 1 to 5, and in column MTAI-37, numbers 1 to 4 indicate the factors extracted in that study with items having a factor loading of .3 and above. These items are included in the respective forms. √ indicates an item being selected in the other short forms. In column MTAI-27, 82 or 83 indicates the year when the item was found to have discrimination index of .2 or .3 respectively while √ in the same column indicates that the item is not discriminating in any one year or study but is included in the shorter form MTAI-27.